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ABSTRACT

A project promoted job literacy skills, improved worker productivity, and completed job-related literacy training covering the three phases of textile manufacturing. It created successful job-related training programs for greige mill and finishing plant employees through the following methods: conducting task analyses, modifying and creating curricula, identifying workers' job literacy deficiencies, and implementing curricula and evaluating curriculum effects. The project unified the task analyses and curricula for the three phases of the textile process. Ninety-nine students attended General Educational Development (GED) classes; 25 passed the GED exam. The evaluator used the main objectives and project activities to develop a set of basic project elements that were organized into a monitoring checklist to assess time and degree of implementation of each element and to develop evaluation questions to serve as the basis of the summative evaluation. Where pre- and posttests were available, statistically significant increases were found in math and vocabulary. Utility analysis results indicated highly cost-effective educational benefits. Results of two follow-up studies suggested that classes were a valuable experience that helped participants form positive work attitudes and gave them an entry point/incentive for further educational efforts. Participants reported improvements in self-esteem, self-confidence, and communication and computer skills. (Instruments are appended.) (YLB)

ED 369 950

National Workplace Literacy Demonstration Project

award # V198A20218-92

Workplace Literacy Across the Three Phases of Textile Manufacturing

William R. Fisk

Clemson University

Performance Report

April 22, 1994

U.S. DEPARTMENT OF EDUCATION
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Accomplishments vs Objectives

The primary goals of this project were to: 1) promote job literacy skills, 2) improve worker productivity, and 3) to complete job related literacy training coverage of the three phases of textile manufacturing -- spinning/weaving, finishing, and fabrication. In meeting these goals this project accomplished the following with regard to its three objectives.

Objective 1 was to create a successful job related literacy training program for greige mill (carding, spinning, and weaving) employees. In achieving this objective the project completed all six planned activities as stated in the proposal:

1a) Identify the literacy demands (task analysis) for each job in this greige mill.

1b) Match existing curriculum with specific jobs by literacy demands and specific job function.

1c) Modify and create curriculum as needed.

1d) Identify workers' job literacy deficiencies.

1e) Implement curriculum with employees of the greige mill.

1f) Evaluate curriculum effects on employees.

Objective 2 was to create a successful job related literacy training program for finishing plant employees. In achieving this objective the project completed all five planned activities as stated in the proposal:

2a) Identify the literacy demands for each job in this finishing plant.

2b) Identify/create curriculum appropriate for each job in terms of literacy demands and specific job function; i.e., identification of functional context curriculum materials.

2c) Identify workers' job literacy deficiencies.

2d) Implement curriculum with employees of this finishing plant.

2e) Evaluate curriculum effects on employees of this finishing plant.

Objective 3 was to unify the task analyses and curricula for the three phases of the textile process. In achieving this objective the project completed both planned activities as stated in the proposal:

3a) Collect the task analyses and curriculum materials for all three textile processes.

3b) Create an overall job mobility literacies chart for all three textile processes together.

Planned Schedule and Revisions

The time line for completion of project activities, Table 6 in the original proposal (attached here), was followed quite closely for activities #4, #5, #6, #7, and #8, except that Plant 1 & Plant 2 were reversed -- Greige was #2, Finishing was #1. The major changes related to activities #1, #2, and #3--task analyses, curriculum, and job mobility charts. Each of these activities was accomplished but they were accomplished in parts, spread out across the project. There were three reasons for these changes.

The first reason was that our planned strategy of doing one department at a time, in order to be able to learn from our efforts and make improvements in each successive offering, worked well but required more time in curriculum and job mobility charting than we had anticipated. The second reason was that the program encountered a delayed start as the business partner completed construction of a new on-site classroom facility for us.

Finally, there were also changes in our approach that were necessitated by events beyond our control. Most specifically, we had to struggle with major downsizing layoffs and major changes in management personnel. These changes impacted the number of people available for classes, our timeline in completing the promised work, how we used our "experimental" industrial engineer, and how we received employee input.

The "input" problem was that we were not allowed to pull employees from the floor for our proposed Steering Committee, so we were not able to have one. Instead we relied on the input from employees and supervisors during task analyses and classes.

Our experiment in collaborating with an outside-the-company industrial engineer took new form. Instead of only heavily consulting with us during task analyses in the first six months of the project, we had more sporadic consultation over the life of the grant and we had use of the graduate assistant on an exciting MSDS (Material Safety Data Sheets) project throughout the grant. This change was very positive and has produced a prototype computer assisted instruction program for MSDS classes which is far more than the grant promised or really paid for.

The management personnel changes were good for us in the long run in terms of support, but they held up our progress in the finishing plant for over two months when we could not get the new plant manager to meet with us. The delay led us to modify our timeline and approach significantly. We adjusted the times we would do task analyses and stretched them out much farther into the grant

period. We also adjusted the timing of the class offerings and overlapped classes for the finishing plant and classes for the greige mill.

These three problems had no significant effect on the scope of work. Together they did, however, extend the completion of the first three activities across the entire project.

Another change that occurred was that we did not conduct separate department classes for each department as first planned. In doing the task analyses, we determined that several smaller departments needed the same basic literacy skills, and simultaneously the number of employees in these departments was dramatically reduced. The result was the combination of departments in several class offerings.

Other changes to our procedures occurred mainly due to things we have learned -- i.e., these changes we purposely decided upon. We have made changes in the way we handle vocabulary instruction and, as discussed under Evaluation Activities later in this report, in two of our Performance Outcomes for the project.

We made changes in the way we handle vocabulary instruction based on our experiences with the first project. We found that our previous effort to build departmental vocabulary lists and to focus classes on these words was not productive for those in our special department-specific classes. While employees new to the department benefit from this (we used it in new-hire training classes), we found that current employees knew the words. This created a ceiling effect and class instructional time that could be better used. Thus, we chose to integrate all vocabulary instruction into our math, our problem solving, and, to a lesser degree, our communications classes.

Project Participants

The participants in grant classes included job-specific, GED, and beginning reading classes. At the time of the proposal there were 1,060 employees in the two plants and we hoped to directly teach 325 or 30% of these employees. During the grant period the plants experienced extensive "down-sizing" which resulted in an employee pool of closer to 700. The estimated impact would then be about 200.

There were roughly 35% (240) of the workforce who volunteered during the grant period for classes that directly served them. The remaining 65% have the indirect benefit of a program and classes now being an established part of this plant's activities. They also have available the job

mobility charts to which they can refer when considering promotions, transfers, and/or future jobs.

[In addition, our other non-grant activities benefitted in-part as spin-offs and additional classes for these and other employees at this worksite (4 plants). As a result we also served an additional 534 employees in non-grant classes or employees in non-grant plants. Naturally, these courses were funded by non-grant sources but their enrollments were enhanced by the grant activities.]

From July 1, 1992 to July 1, 1993 there were 99 students attending GED classes for a total of 2,477 hours of instruction. Of these students there were 25 who passed the GED exam during this period. Many of these students started with our job-specific classes.

Plant/Dept.	**# in Dept.**	**Participants**	**%**	**Finishers**	**%**
Finishing					
Maintenance	64	32	50%	23	72%
Dye/Nap/Fin	58	12	21%	4	33%
Print	124	25	20%	10	40%
Bleach/Inspect	62	7	11%	5	71%
Greige					
Card	36	14	39%	9	64%
Cloth	40	11	28%	6	55%
Spinning	97	25	26%	20	80%
Weave	209	74	35%	46	62%
TOTALS:	690	200	29%	123	62%
GED					
Finishing	308	12	4%		
Greige	382	28	7%		
GRAND TOTAL:	690	240	35%		
Indirect impact -- additionally at this class site: (i.e., from other non-grant classes & non-grant employees taking classes)		534			

Dissemination Activities

The dissemination activities for this project have been extensive and have included the following:

1) National presentations

   COABE Annual Conference; New Orleans, LA; 6/93.

   Higher Education & Workforce Development National Conference; Saratoga Springs, NY; 6/93.

   [Two papers to be presented at COABE Annual Conference; Phoenix, AR, 6/94.]

2) State presentations included:

   State Share Group Meetings (state educators & business people);

   SCAACE day in Columbia, SC

   Workplace Resource Center, Greenville, SC

   "Poor Man's Cruise" -- to 30 teachers & directors from all over the state

   Anderson (SC) Workplace Education Network Group

   State representatives: Butler Derrick (state), Thomas Alexander (Oconee), Lindsey Graham (Oconee), Claude Marchbanks (Oconee), Harry Stille (Anderson, Abbeyville)

   Individual meetings with business people at the following plants: Phillips Fibers, Michelin Tire (3 plants), Wellman, WestPoint Stevens (3 other plants), MayFair Mills, Cone Mills (NC & SC), Glenn Raven Mills, Jacob's Chuck, Wellman Co., and TeePak.

3) Tours and informal consultations with many businesses planning or starting workplace programs.

4) Close cooperation and sharing of materials with the SC Workplace Literacy Resource Center.

5) Numerous radio interviews on both public and private radio stations.

6) Coverage of our program by the SC Literacy Assn., the SC Chamber of Commerce, the SC Textile Manufacturers' Assn., and the Governor's Initiative for Work Force Excellence.

7) Full day on-site seminar 10/22/93 for educators and businesses from around SC, NC, & GA.

8) Distribution of various parts of Task Analysis Job Mobility charting to various programs who have requested them at different times.

9) Distribution of this report, the evaluation report, task analyses / mobility charts, and curriculum booklets to the Clearinghouse on Adult Education and Literacy (U.S. Dept. of Educ.), ERIC Clearinghouse on Adult, Career and Vocational Education (CETE), and the Southeast Curriculum Coordination Center.

Evaluation Activities

The evaluation method was designed and executed by Dr. Nancy Peck. The evaluation of this project was both formative and summative.

For the formative evaluation Dr. Peck used the main objectives and project activities to develop a set of basic project elements. These elements were organized into a monitoring checklist to assess the time and degree of implementation of each element. Implementation of elements was verified continually by monitoring the following data provided: project director's log books; on-site coordinator's log books; instructors' records and test scores; factory personnel records; plant supervisors' reports; meeting agendas and minutes; and product development. In addition to data provided to her, the evaluator made seven on-site visits for observations of training sessions, for interviews, and to inspect records.

Dr. Peck analyzed the project objectives and developed evaluation questions to serve as the basis of summative evaluation. During the course of the project, she recorded, verified, and filed summative data. A final evaluation report was developed at the end of the project. Products developed during the project (e.g., job mobility chart, curriculum materials) were done according to prior specifications.

Formative and summative evaluation records were kept by Dr. Peck who provided periodic oral and written feedback to the project director and staff via the Advisory Team meetings. These records provided descriptive background information for dissemination reports and the final evaluation report that will be helpful to those interested in replicating the project. (Please see Final Evaluation Report.)

Based on the overall project goals, objectives, and activities, there were five measurable performance outcomes used to guide the evaluation efforts. The first three were to be used to evaluate objectives 1 and 2. The other two performance outcomes were products that were finished by the conclusion of this project and used to evaluate objective 3.

Performance outcome #1: Workers trained will show significant, meaningful increases on literacy skills tests of reading, writing, problem solving, computer, and/or math skills.

Performance outcome #2: Workers trained will show significant, meaningful increases in job productivity, by improving measures such as unit-time production and quality control.

Performance outcome #3: Workers trained will show an increase in self ratings and supervisor's ratings of attitude toward job, cooperation with other employees, job skills and abilities, and job motivation.

Performance outcome #4: A notebook-type of publication will be created which includes both task analyses and curriculum guides for all three phases of the textile manufacturing process.

Performance objective #5: A master job mobility chart for all jobs across all three phases of the textile manufacturing process will be created. This chart will show the educational competencies needed for each job, and will be presented as much as possible in an hierarchical format.

Assessment of Performance Objective #1 was originally intended to be accomplished using pre-post competency and/or standardized testing. Again, our previous experiences dictated that we downplay the "testing" component of our classes because it caused students to drop out or refuse to come back for classes in other areas. As a result we struggled with our pre-post testing and used competency-based checklists and CAI monitoring in many cases. (A complete analysis of this, including results, is presented and discussed in the Evaluation Report.)

Our planned Performance Objective #2 was to assess instructional impact on productivity directly via plant records for absenteeism, waste, production, etc. Project one showed us that this type of effort in an 18 month project is not workable. The variables at work beyond our control are too numerous to handle in an easy data analysis manner. It was determined that a competent, full-time data collection and analysis person might be able to pull this off, but such a person was not written into the project. In addition, it was noted that seven or eight week grant classes were not enough to make large short-term impacts in productivity measures; the impacts develop slowly and are seen in more long-term measures taken for such variables as job retention, job mobility/adjustment, and overall plant production. The need is for long-term impact evaluation.

Toward that end we focused on long-term impact in two ways. First, we explored the use of Utility Analysis methods to predict long term impact in dollars. We believe that this method may be the best approach because it "talks the language" of the business community. The results and methodology of this approach were presented at our close-out seminar, are in our Evaluation materials, and are being prepared in paper form for the 1994 COABE conference and future publication. Secondly, we piloted a long-term follow-up approach for the employees from our first project. We believe this was a better use of our limited data analysis time. The major time spent on gathering this data was paid for with $300 grant money and $300 Clemson University College of Education funding, using a graduate student who had been "drawn into" our on-site work by her interest in the adult

educational efforts there. Again, the results and methodology of this approach were presented at our close-out seminar, are in our Evaluation materials, and are being prepared in paper form for the 1994 COABE conference and future publication.

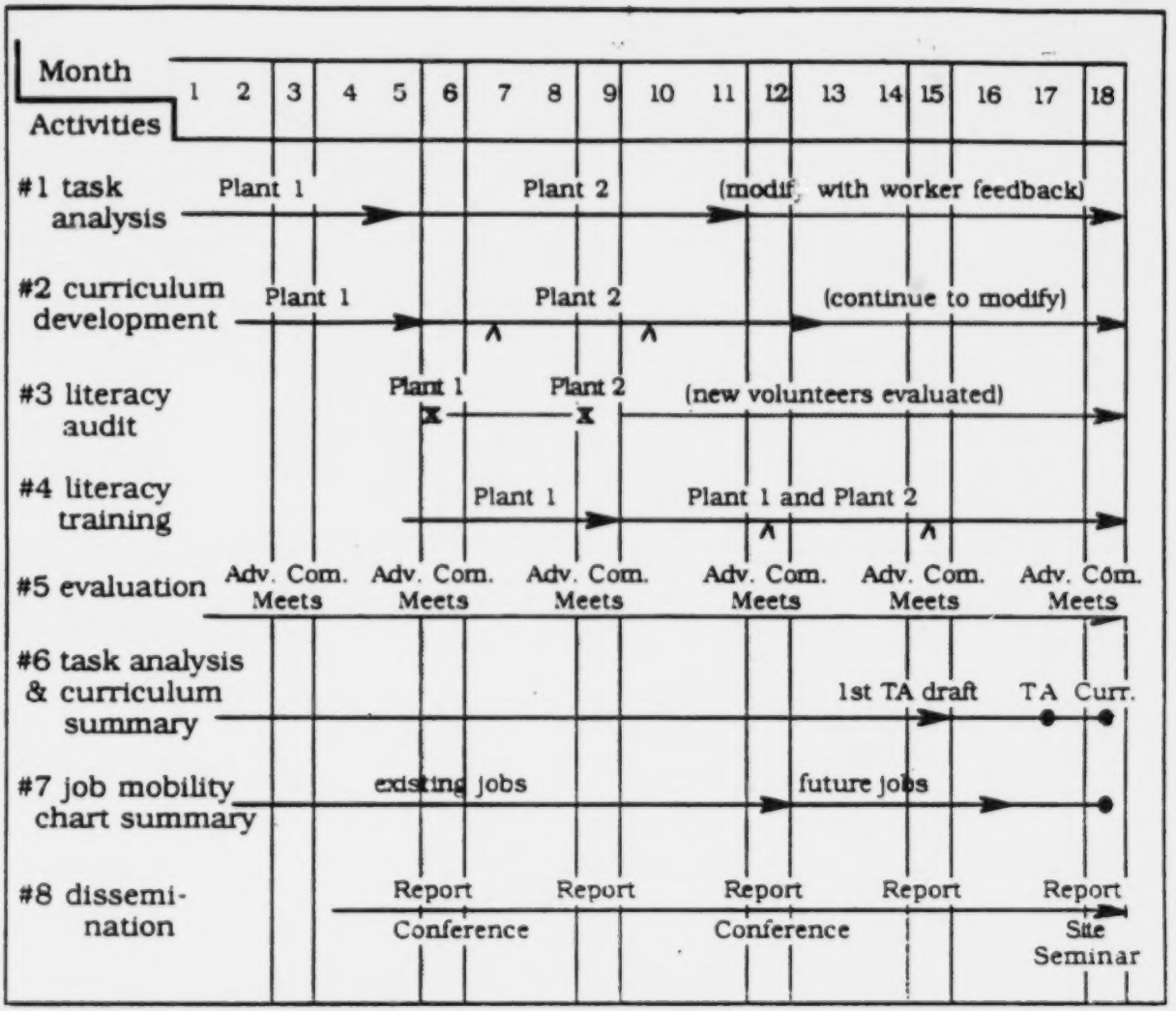
In the case of our original Performance Objective #3 we had planned to assess worker and supervisor attitudes via a questionnaire used in project one. Project one results showed us that this measure was very time consuming and not very discriminating. We therefore chose instead to use anecdotal classroom student reports and sample evaluator interviews with employees and supervisors to assess attitude changes.

Performance objectives #4 and #5 were basically combined. It turned out that the sheer quantity of jobs we dealt with required too extensive a listing for a simple hierarchical document like we had hoped to create. The result was that we collapsed #4 and #5 into one format that is easier to use than two separate documents. The result was a rather large set of information that did meet the outcomes targeted.

6. Changes in Key Personnel

The Program Director written in the proposal was changed once the grant was awarded because the listed person had moved. After the start of the project there were no changes.

Table 6. Time-line for Completion of Project Activities.



Plant 1 = Greige Mill

Plant 2 = Finishing Plant

National Workplace Literacy Demonstration Project

AWARD No. V198A20218-92

Workplace Literacy
Across the Three Phases of Textile Manufacturing

Clemson University

Evaluators

Nancy L. Peck, Ed.D.

Maria Isabel Panizo, Ph.D.

1992-1993

EXECUTIVE SUMMARY

The primary goals of this workplace demonstration project are to 1)promote and improve job literacy skills within all phases of a textile manufacturing plant and 2) improve worker productivity. The project focus is on the development of job relevant literacy training within the plant. The project process included a task analysis of jobs, the development of a job relevant curriculum and subsequent training in math, reading and communication skills.

The staff worked as a well coordinated team through all phases of the project. The diverse project related experiences of the advisory committee added a rich blend of ideas to continually fine tune the project components.

For the staff to understand the skills needed to perform each job and the literacy demands that correspond to each skill, a task analysis was developed for each job. As the task analysis in each department was completed, curriculum was developed that incorporated the literacy skills relating to the job description. Instruction within the training classes was job related when possible and delivered in a motivating and non threatening manner.

Numerous challenges were posed to the staff throughout the duration of the project. The primary obstacles resulted from a major change in management and the downsizing of the plant. Both situations called for flexibility and creativity from the project staff.

The purpose of the evaluation is to assess the extent to which the goals of the project have been achieved. Both formative and summative data have been collected and analyzed. The formative data documents the process followed while both qualitative and quantitative data were collected to attain summative results. Evaluation procedures included pre-post tests, structured interviews, questionnaires and observation.

There was a 35% participation rate and a 62% finishing rate. The assessment of participants' literacy gains varied across departments. Where pre and post tests were available, statistically significant increases were found in math and vocabulary.

A Utility Analysis was used to estimate in dollars and cents the impact of educational efforts in the workplace. Results indicate that the project's educational efforts had positive impact and were highly cost effective for the business.

Results of a two long-term follow up studies suggest that the

education classes were a valuable experience that helped participants form positive work attitudes. Additionally, the education classes provided an entry point and/or an incentive for further educational efforts.

Data gathered through interviews and questionnaires show that participants were positively effected by the project. Participants reported a number of gains from their participation in the project. Improvements in self esteem and self confidence, as well as in communication and computer skills were also found as indicated by employees' testimony. Selected Plant supervisors rated computer skills, reading skills, conflict resolution and communication skills as the areas with the highest impact.

In summary, the National Workplace Literacy Demonstration project resulted in a number of positive outcomes. Recommendations/ observations can be found in page 51 of this report.

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INTRODUCTION

This literacy demonstration project attempts to build and expand on a previous demonstration project which focused on the development of job relevant literacy training for a Fabrication Plant, a facet of the textile manufacturing process. This project completed the job literacy analysis for the full textile process by focusing on the Finishing Plant and the Greige Plant (carding, spinning and weaving). The goal of the project was to finalize the literacy task analyses of the jobs within a Finishing Plant of 475 employees and a Greige Plant of 585 employees. These analyses identify the specific literacies needed to best perform each job within the plants, as well as those jobs anticipated to be available in the future.

Curriculum was developed based on the results of the task analyses and individual prescriptions were written to reflect individual job descriptions. Because of the increased technology, especially in automation changes, training was concentrated in the areas of reading, math and communication. In addition, teaching techniques and activities were implemented to promote computer skills, decision making, problem solving, conflict resolution and group relations.

GOALS AND OBJECTIVES OF THE PROJECT

Originally, the primary goals of this project were to: 1)promote job literacy skills, 2)improve worker productivity, and 3)complete job related literacy training coverage of the three phases of textile manufacturing, namely, carding/spinning/weaving, finishing and fabrication.

The objectives and related activities of the project were as follows:

Objective 1 - To create a job related literacy training program for the Greige Plant.

Activities

1a) Perform a task analysis of the jobs in the Greige plant.

1b) Match existing curriculum to job literacy demands.

1c) Modify and create curriculum.

1d) Identify workers' job literacy deficiencies.

1e) Implement curriculum with employees.

1f) Evaluate curriculum effects on employees.

Objective 2 - To create a job related literacy training program for Finishing Plant employees.

Activities

2a) Perform a task analysis for the jobs in the Finishing plant.

2b) Identify/create functional context curriculum materials.

2c) Identify workers job literacy deficiencies.

2d) Implement and curriculum with employees.

2e) Evaluate curriculum effects on employees

Objective 3 - To unify the task analyses and curricula for the three phases of the textile process.

Activities

3a) Collect 3-phase task analyses and curriculum materials.

3b) Create 3-phase job literacies chart.

As the project progressed, several necessary adjustments were made that somewhat changed the objectives. These changes will be discussed at a later point in the report.

PROJECT DESCRIPTION

Project Staff

The project staff consisted of a project director, an on-site coordinator and three teachers. One of the most valuable lessons learned from the first demonstration grant, was the importance of the staff working as a team. As a result, all members worked on, and became familiar with, all aspects of the training procedure to assure that there was an understanding of the job skills as they related to the curriculum. In addition, three out five staff members had the experience of working on the first project,

insuring a smoother procedural start up. The staff met weekly to ensure that problems were dealt with quickly and communication was clear. There was little chance to communicate without specifically timed meetings, because classes were spread out within a 16 hour time frame to accommodate the various shifts of the employees. In fact, as the project progressed, the limited amount of time to communicate and plan together, became a limitation of the project.

Advisory Committee

A well balanced advisory committee was formed at the beginning of the project. It met every three months to become informed of the progress of the demonstration project, and offer advice on problems encountered. The members of this committee were carefully chosen to bring different perspectives to the problems and solutions of literacy in the workplace. The members of the advisory committee included: the manager of People Programs at Spring Textile Industries, Charlotte, N.C.; an Associate Professor of Industrial Psychology from Clemson University; California State Adult Education Director at Sacramento; the Director of Clemson Apparel Research; the Evaluators of the Project from Miami, FL. and an Associate Professor from Industrial Engineering at Clemson University (see Appendix section).

Partnerships

Collaboration of the partners was a strong feature of the literacy project. A cooperative working relationship was established between the school of education at Clemson University, the WestPoint Stevens Plant in Clemson, and the Oconee Adult Education division of the Oconee Public School System. The effectiveness of implementing the program depended, to a great part, on nurturing a positive relationship between and among the collaborative partners. The project staff coordinated this effort effectively.

Project Structure

Employees in the Greige Plant and Finishing Plant were targeted for the workplace literacy classes. The departments in the Greige Plant include carding, spinning, weaving and cloth. The Finishing Plant departments include maintenance, dye, napping, finishing, print, bleach and inspection. Classes of 21 hours or three times a week (1 hour) for seven weeks, were offered to all departments on three shifts. During those 21 hours of class, math, reading and communication skills were taught. The hours dedicated to each, varied with the needs of the employees in each department.

Description of Project Participants

A total of 240 employees participated in the project. This number represents 35% of the number of employees in the Finishing

(n=308) and Greige (n=382) departments. This is a higher percentage than what was initially projected.

Sixty-two percent completed the department specific classes in the program. Additionally, 40 other employees, representing 6% of the employee population, enrolled in the GED program. Figures 1 through 4 show the percentage of participants enrolled in the department specific classes of the program and the percent who completed these classes by department.

Figure 1.

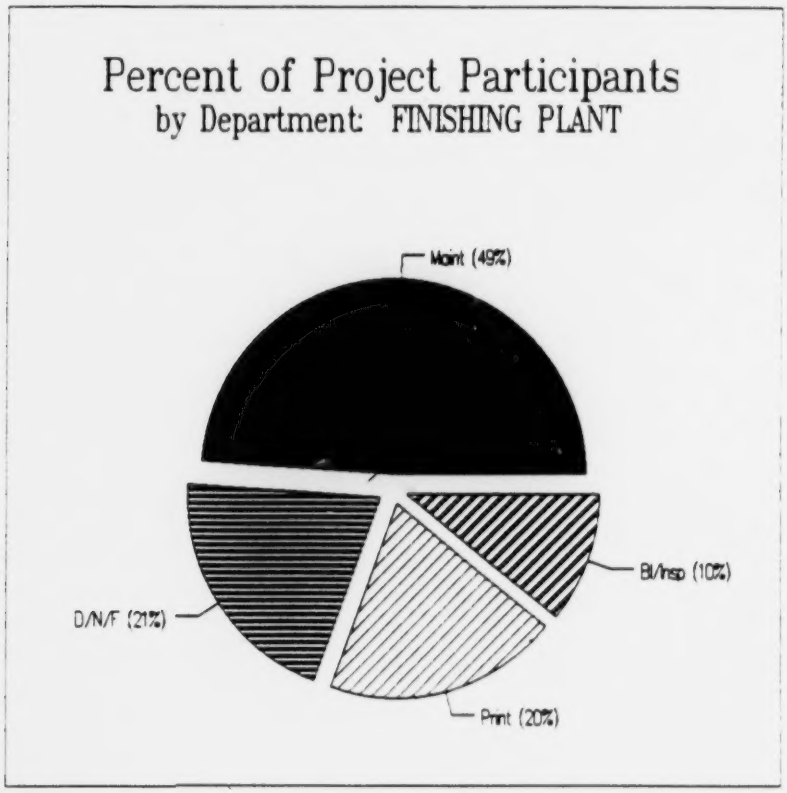


Figure 2.

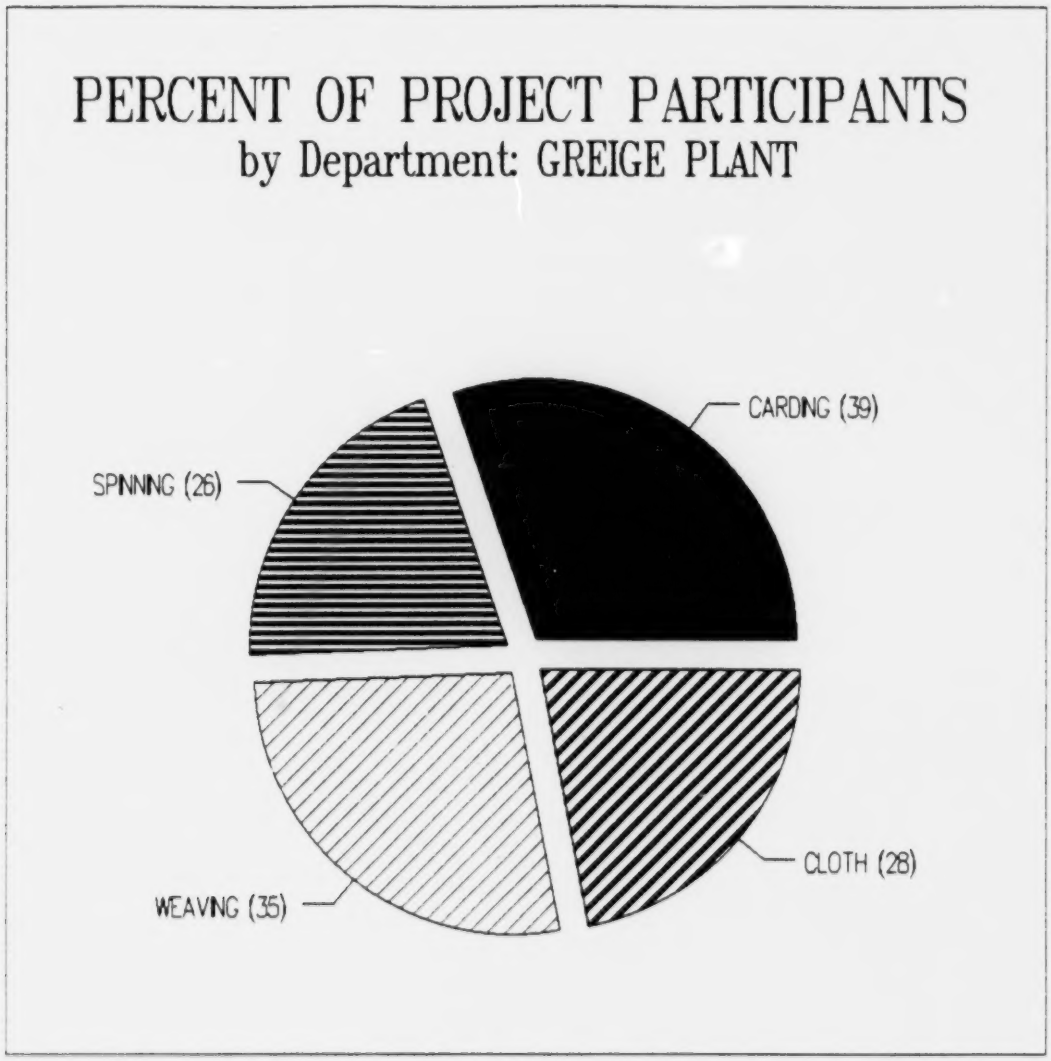

PERCENT OF PROJECT PARTICIPANTS
by Department: GREIGE PLANT
CARDING (39)
SPINNING (26)
CLOTH (28)
WEAVING (35)

Figure 3.

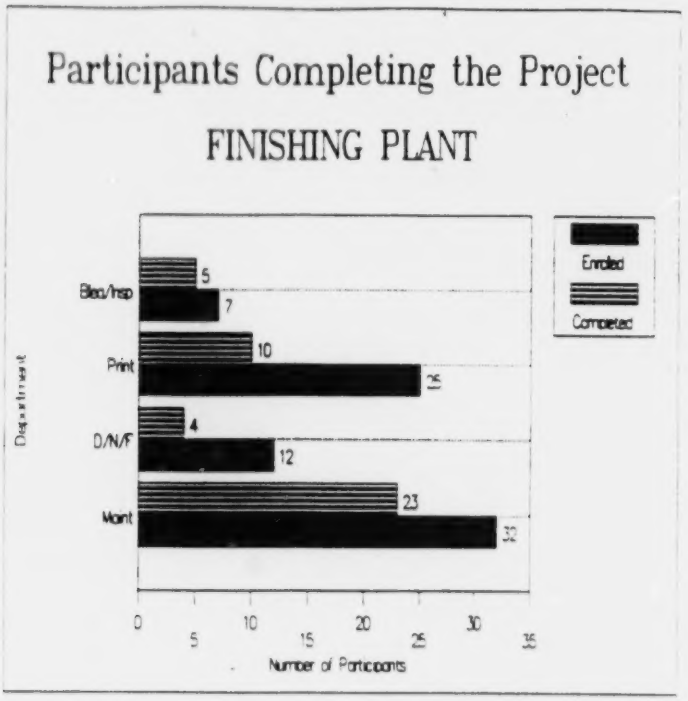
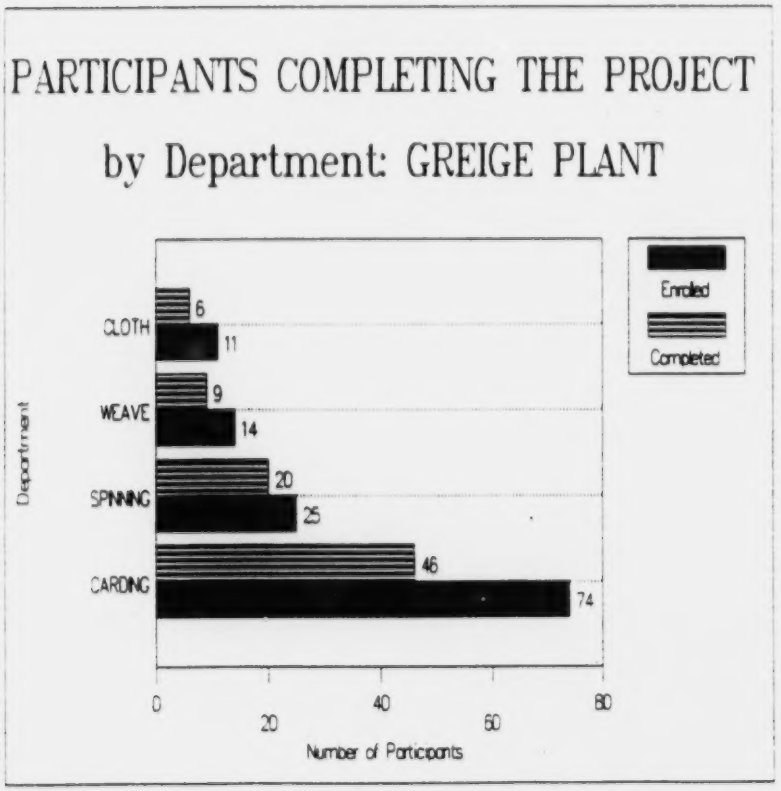


Figure 4.



DESCRIPTION OF THE EVALUATION

Purpose of the Evaluation

It is the purpose of this evaluation to assess the extent to which the project goals and objectives have been accomplished. The evaluation is both summative and formative.

It is formative in nature, documenting the processes followed, obstacles encountered, and changes made in response. It is critical that the various program components and activities in this project be described and documented in order to establish probable links between project participation and project outcomes. Documentation and description of this process is particularly important for replication purposes. It is important to remember that this is a demonstration grant. Therefore, implementation of project components was conducted in a flexible manner, lending itself to changes in response to the needs of the participants.

The evaluation also focuses on summative results. The goals and objectives are examined to determine to what extent they have been altered and/or met. Both qualitative and quantitative data have been included.

Evaluation Procedures

Overall data collection and procedures are included below:

1) A total of seven site visits were made for purposes of data collection, observation of project implementation and interviewing project staff and participants. At these visits, assessment of project development was also conducted and meetings were held with the Advisory Committee.

2) Initial meetings with the project staff were held with the purpose of fine tuning the evaluation design, as well as determining the processes that would be followed. Data collection points were also established.

3) Interviews were held with both plant supervisors and project participants. The purpose of the supervisors interview was twofold. First, they served as an attitude check on if supervisors considered that there were any behavioral changes on the part of the participants. Second, they served to measure management support for the project.

4) Qualitative data for participants was gathered through the use of interviews in a case study approach.

5) Structured questionnaires were administered to teachers, project participants and plant supervisors to assess their opinions about the program and its impact on the plant and the employees.

Evaluation Instruments

A number of measures and instruments were used for assessment. The following instruments were utilized to assess participants' literacy gains and teacher, supervisor and participant perceptions about the project. Additionally, evaluation forms were filled out by participants after completing each class module.

Teacher-made Tests

Teacher-made tests were utilized to assess literacy gains due to class participation/after project completion. In some areas, pre and post tests were utilized, in others, a post test only design was used, and still in others no measurement took place.

Communications Post Test

A test designed by the evaluator with input of the instructor was utilized as a post test measure to assess students' perceptions about the communication skills class. Likert type items as well as true/false and open ended questions were utilized. A sample is enclosed in the Appendix section.

Supervisors Questionnaire

The supervisors questionnaire was developed by the evaluator with input from the project staff. It was administered with the purpose of assessing management perceptions and opinions regarding project implementation and impact on participants. It

consists of three broad questions including a number of options to be checked off. A section for additional comments was also included. A sample is enclosed in the Appendix section.

Employee Questionnaire

The employee questionnaire was developed by the evaluator with input from the project staff. It was administered with the purpose of assessing employees' perceptions and opinions about the project and the extent to which it was useful to them. Open ended and multiple choice questions, as well as a section for suggested changes and additional comments were also included. A sample is enclosed in the Appendix section.

Teacher Questionnaire

A teacher questionnaire was developed by the evaluator to assess their opinions regarding project impact on participants. Questions relating to the process of project implementation and curriculum development were also included. A sample is included in the Appendix section.

Course Evaluation Forms

A course evaluation form developed by the project staff and the evaluator was administered to participants after completing their classes. It was comprised of a total of six open and close ended items. Questions addressed topics such as attendance and suggestions for future changes. Additionally, participants'

ratings of the program and the materials were also included. A sample is included in the Appendix section.

PROCESS EVALUATION RESULTS

In this section the various program components and activities in this project are described and documented. Processes followed, obstacles encountered, and changes made in response are also included in order to establish probable links between project participation and project outcomes. A section describing project outcomes will follow.

Literacy Task Analysis Development

Developing a task analysis for each job was an important component of this project. A search of the literature indicated that there has been no job analyses performed for a textile plant before the initial demonstration project. Experience has demonstrated that if literacy training is to be implemented effectively, it must be designed to meet the job needs of the employees within the plant. To do this, it seemed important for the staff to understand the skills needed to perform each job and the literacy demands that correspond to each skill.

As the process began, the site coordinator set up meetings with the supervisors of each department to explain the purpose of the task analyses and the procedures that would be followed. This

communication was important to establish a climate of understanding and cooperation. The project team, which consisted of the director of the project, the project coordinator and the three teachers, studied all aspects of each worker's job on the floor. This was accomplished by observation, employee and supervisor interviews and by reading materials related to the job. This information was used to determine the literacy skill demands of each job in each of the departments in the Finishing and the Greige plants. As the task analysis in each department was completed, curriculum was developed that incorporated the literacy skills relating to the job descriptions.

Task Analysis Process in the Maintenance Department

In an attempt to describe the task analysis process more clearly, the steps followed by the staff while analyzing the maintenance department are outlined below to demonstrate the complexity of the process. In each step the staff:

1. set up a meeting with the maintenance department manager to discuss the project's short and long term goals and to discuss the critical needs of the department from a management perspective.
2. requested a list of newly revised job descriptions.
3. collected and studied machine manuals, procedures forms etc. relevant to the jobs in the maintenance department.
4. scheduled meetings with all supervisors (three shifts).
5. asked supervisors for names of recommended employees to interview and observe. One from each job and one from each shift were interviewed.
6. scheduled meetings with the employees in the classroom to explain the floor procedure for task analysis and explain

its purpose. They also asked for input regarding current and anticipated job tasks and gave feedback on instructional materials that would be developed.

7. asked supervisors to provide them with a thorough overview and orientation to the Finishing Plant.

The task analysis process can be illustrated by using the maintenance department as an example. The project staff learned that the maintenance department consists of several separate groups of workers who comprise the work force. Most jobs fit into the categories of mechanic, electrician, building maintenance, housekeeping, and waste management technicians. The varied job types presented a complexity of skills needed and levels of learning required. Educational needs of the employees range from basic literacy to preparation for waste treatment license and electro-mechanical classes.

The teachers indicated that the supervisors in maintenance were extremely cooperative and helpful in providing them with ideas, plans, a needs list and brainstorming solutions to anticipated problems. Teachers were offered the use of the conference room to hold the classes and the department also provided drinks so that an informal, positive environment could be established and participation would be increased.

Recruitment

Recruitment for the maintenance department proceeded as planned. The procedure was to notify the managers and supervisors of the

need to begin the recruitment process and set up a time to meet with the employees on each shift and describe the program. At the recruitment meeting, the employees appeared to be motivated and encouraged by management. This was evidenced by having over 50% of the maintenance department employees participate in the literacy classes.

Recruitment of the employees in the other departments was expected to follow the already developed and effective plan of operation implemented for the maintenance department. However, during the summer of '92, the internal structure of the textile plant underwent substantial changes in management and downsizing of the plant. Just prior to the next department recruitment meeting, it was announced that the plant was cutting back production and that a large number of employees would be fired or laid off. These changes substantially altered the carefully planned procedures of the literacy in the workplace project and led to unplanned changes.

Impact of Management Changes

The managers that had been accepting of the project goals and convinced of the need for literacy training, were now transferred to another plant. The new management was faced with numerous challenges and problems that needed to be solved and the literacy project was clearly not a current priority. As a result, the staff was unable to schedule recruiting meetings or, for that

matter, to even meet with the new managers to explain the goals of the project and the expected benefits of the program to the employees. This became a major setback for the project in terms of time and progress.

This setback continued through the fall of 1992 and the decision was finally made to seek assistance from the general plant manager who was an initial proponent of the literacy project. The general plant manager quickly interceded with the new management, explaining to them the importance of the literacy project and the need for their support. With this encouragement, the tone of cooperation altered and meetings were scheduled to meet with the department heads for recruitment scheduling.

Teachers did motivate many of the employees to the classes, but their best efforts failed to attract a majority of the employees in several of the Finishing Plant departments. In addition to the stalled management problems, the reasons for the less than projected attendance in the literacy classes appeared to be many and varied:

- The primary reason was that the Finishing departments were being downsized during the same time the project was operating and employees were in perpetual fear of being laid off from work.
- The Finishing and Greige plants have traditionally not been involved in training programs. The original grant was written for the Fabrication Plant and all negotiation had originated in that division. As a result, management was aware of the need for literacy training, and indeed, had initiated the request for the original grant. It was the view of the employees that

were interviewed, that as everyone became more familiar with the concept and word of mouth spread, more and more employees would participate in the classes.

- The Fabrication Plant is made up almost entirely of women while the ten new departments are 90% men. The women there, appeared to have more positive feelings toward education than the men. We continue to search for a better understanding of the relationship between attendance and gender.

- The participants interviewed, men for the most part, had negative experiences in school, and many had dropped out. These experiences appear to have left many of the employees with feelings of intimidation, fear and poor self esteem. The teachers, during the recruitment sessions, tried to allay their fears by attempting to convince them that the plant classroom was a caring place where successes were realized. This attitude had an impact on testing, since the testing process tended to turn off weaker participants.

- Twelve hour shifts in these departments left the employees too tired to want to add two or three more hours of class to their already long day.

- The summer months, it became clear, were a poor time to recruit, since the employees wanted to spend the extra hours they had with their children who were home from school. Vacations were also an interfering factor.

- Lack of support from management in initial stages of the project took its toll as described earlier in this report.

Incentives

Most of the employees in the Greige Plant work 12 hour shifts and convincing them to spend another three hours a week in the classroom for seven weeks, was a difficult task. The incentive offered by the plant was an agreement to pay for one of every three hours spent in the classroom. Additional incentives included the improvement of one's self, greater chance of upward

mobility in the plant and greater job security. Encouragement from supervisors and department managers provided another incentive, but the degree of encouragement varied from department to department. Banquets were held for program participants and awards (e.g., t-shirts and calculators) were given to employees with perfect attendance.

Program Development

Curriculum /Materials Development

When the task analyses was completed, the development of the curriculum and related materials began. The curriculum was determined by the job demands found in each department and the anticipated educational level of the employees. As a result, the curriculum emphasis varied according to the needs of the employees as well as the jobs they held in the plant. An assessment was made by the staff at the completion of the task analysis that the most vital elements for employee growth were reading, math and communication skills.

The first department, maintenance, focused on the vocabulary used in the plant, using the computer program designed for this component. The on-the-job vocabulary was not as vital for the rest of the Finishing departments and therefore, was eliminated from most of the classes. In addition, math functions appeared to play a more vital role and were increased. It was decided by the staff to combine the reading comprehension and math

curriculum, using reading problems for math that were more relevant to their jobs.

Communication skills were thought by the staff to be vital to the employees both in and out of the plant. In addition, communications had become the most popular component as expressed by the employees. The design included emphasis in listening skills, oral skill development, human relations, conflict resolution and problem solving.

The math module in Finishing included measurement and the metric system. Though employees work daily with measurements in the plant, they don't necessarily understand the concepts involved in the process. The metric system was in place in the plant, but employees needed to become more automatic in it's application. In addition, the staff found the math levels were higher in some departments and therefore the materials needed to be changed to reflect a higher ceiling level.

Material Safety Data Sheets (MSDS)

One of the outcomes of implementing the grant has been the develoment of educational materials linking basic skills training in the classroom, to work done on the plant floor.

Supervisors at the plant read the material safety data sheets to their workers. Because of the high vocabulary level of the

safety data sheets and the generally low literacy level of the workers, this method proved not to be beneficial. Workers did not seem to have a full understanding of the chemicals they use. Thus, educational software was developed on material safety data sheets (MSDS).

The software is presented in two modules addressing two areas: 1) technical vocabulary and 2) the material safety data sheet format. Whereas the first module defines the highly technical and legal vocabulary found in the data sheets at a more appropriate reading level for the workers, the second module establishes a link between classroom literacy skills and job-oriented training. It is expected that after completing work with the software package, the operator should be able to:

1. Recognize and give simple definitions for important, often used vocabulary words found on material safety data sheets.
2. Be able to find standard information on a material safety data sheet.
3. Be able to take proper steps in a hazardous chemical situation.

The effectiveness of the software was tested in a pilot study conducted with five workers. Operators' experience in computer knowledge ranged from none to slightly experienced. A pre-post test design was used to assess gains in their level of knowledge

regarding the vocabulary and format of the MSDS. A survey was also included.

Although no statistically significant differences were found when comparing pre and post test scores, three of the five participants obtained a higher post test score. Qualitative data collected through a questionnaire indicates that participants liked the software and rated it as easy to learn. Respondents also indicated that after using the program they were better able to use the safety data sheets while working on the plant floor. Responses helped in fine tuning the program and making revisions on the vocabulary words used and their difficulty levels.

Qualitative data demonstrates a high interest in the program which further suggests that using a higher number of participants and a more closely controlled study, statistically significant results could be found.

Instructional Methodology

The vocabulary component, which was only used for the maintenance department, was adapted for the computer program that had been designed for that purpose during the first grant, substituting the appropriate vocabulary for their department. Instructional strategies in math included a hands on approach for the measurement section of the math module and relevant math problems similar to those found in the plant. A computer program was

designed, for instance, that taught the participants how to read and understand the financial breakdown of their pay stubs.

Because of the diversity of the reading and math levels of the participants, it was important that the learning environment be as individualized as possible. Throughout the duration of the grant, the staff constantly worked toward individualizing the reading and math components. Individual Educational Plans (IEP) were developed when necessary, however, total individualization of the program was not possible due to time constraints on the teachers.

Small group discussion, role playing and situationals were the instructional methods most often used in communications. The participants commented that they particularly enjoyed taking a personality test which led to a greater understanding of themselves as well as the behaviors of their co-workers. In the communications component, employees were also able to discuss, often for the first time, the frustrations, conflicts and problems they experienced in the plant. As a group, they discussed appropriate behaviors or possible solutions to their problems. The communication classes enjoyed broad based acceptance from the participants.

Educational Training Process In The Plant

For purposes of evaluation and demonstration, it was important to document the entire training process that was finally established, including the prerequisites to employee training. The sequence of these training activities are as follows:

- Conduct orientation for the staff.
- Plan and attend meetings with the plant manager and department manager to explain the project and procedures that will be followed. It is important to stress the relevance and importance of the educational component as it relates to the success and support of the plant goals.
- Meet with supervisors to describe the:
  1. task analysis procedures
  2. recruitment process
  3. relevancy of classes to production behaviors.
- Conduct task analysis of jobs within plant departments by observing job operation, interviewing employees and supervisors, reading related materials and attending recruitment meetings and new employee training sessions.
- Schedule regular staff meetings to encourage an effective team operation.
- Develop curriculum that corresponds to the needs identified in the task analysis.
- Schedule classes for three shifts.
- Gather baseline data by assessing(pre-test) students.
- Develop an Individual Educational Plan (IEP) for each student.
- Implement curriculum.
- Post-test and obtain an evaluation form from each student.
- Continue to encourage participation within departments.

Changes/Observations

Program changes were made during the implementation of the grant, primarily due to a better understanding of the plant's operation by the staff and the changes occurring within the plant. It was decided by the staff, with advice of the advisory committee, to take full liberty with the flexibility built into a demonstration grant. It became of utmost importance to meet the needs of the participants and management as they arose and abolish, if necessary, preconceived notions on how the grant should be implemented. The program changes, as well as the implications for evaluation, were as follows:

1. The previously constructed vocabulary/reading instruction plan was abolished. The staff found that their effort to build departmental vocabulary lists and to focus classes on these words was not productive for those in the department-specific classes. While employees new to the department benefitted from this, they found that current employees knew the words, thus causing a ceiling effect. As a result, the vocabulary component was combined with the math component and problem solving classes.

   New employee training classes provided by the plant management has incorporated the vocabulary component into their training package. Vocabulary development was also included as a major component of the Material Safety Data Sheets (MSDS) training software, one of the outcomes of the project.

2. A questionnaire, developed in the first project to assess employee and supervisor attitudes, was eliminated due to inconclusive results found in the previous grant and the large amount of time required for its administration.

3. A performance objective, aimed to assess instructional impact on productivity by comparing plant records on absenteeism, waste, and production, was dropped from the goals. The time period of the grant (18 months) to train all departments in both plants, did not allow enough

training time (21 hours for all components) to impact productivity factors enough as to be easily measured. It was also difficult to justify the amount of time necessary to statistically sort out the impact from the many other variables involved. For example, job task changes, new machines, workforce reduction and fluctuations in the number of hours per week that employees worked.

4. A Utility Analysis and a long term follow up study of a sample of first grant employee participants were included instead of the productivity analysis.

5. Management changes and downsizing of the Finishing Plant had a profound effect on the number of participants in the training classes. Instead of the expected 325 employees attending classes, the total number of participants was 240. It is important to note, however, that this was an increase in the projected percent of participants since the number of plant employees was reduced from 1,060 to 690. These same factors also affected the training time line originally designed for the project. As a result, departments doubled up in classes with no apparent detrimental effects.

6. The communication training component took on a greater importance as the grant progressed, as a result of participant response. In post class evaluations as well as observations and interviews, participants indicated that the classes in communication had the greatest impact on their lives and behaviors in the work plant.

7. The role of the industrial engineer consultant changed during the grant as employee needs became apparent. With the assistance of a graduate student from Clemson University, the engineer developed a software program to make the Material Safety Data Sheets (MSDS) more user-friendly in regard to readability levels and comprehension levels of the employees.

8. Teachers noted that because of negative school experiences, the participating employees were fragile in regard to education. To retain the participants, instruction within the classes needed to be creative and innovative, avoiding the more traditional "school" approaches. In addition, anything that resembled testing had to be minimized.

SUMMATIVE EVALUATION RESULTS

In order to evaluate the effectiveness of the program, results of pertinent findings from various data collection instruments were examined. The evaluation questions will be addressed by presenting the results within each plant.

One of the major outcomes of the project is having a high participation rate and moreover a high finishing rate. There was a 62% finishing rate which compared to other adult education programs is high (see for example Quigley, B.A., 1993). The project director stated that the high finishing rate was partly due to having minimized the testing.

Literacy Gains

Finishing Plant

Because of the numerous changes that took place during the implementation of the project, the assessment of students' literacy gains also varied. A schedule of evaluations administered follows. Administration is denoted by xx.

Department	Reading pre/post	Math pre/post	Communic post	Course Evaluations Reading	Math	Commu
Maintenance	xx	xx	xx	xx	xx	xx
D/N/F	n/a	xx	xx	n/a	xx	xx

Students in the maintenance department were tested at the beginning and at the end of their participation in the reading and math classes. Because of the nature of the communication skills class, only a post test was utilized. Additionally, course evaluation forms were given to students for their feedback.

This design changed for the dye, napping and finishing (d/n/f) departments. The d/n/f departments included reading in the math section and therefore only increases in math were assessed. Participants in the print and bleach/inspection departments did not participate. This was due to an interruption in the implementation of the project because of massive plant layoffs and management shifts. Later, when reading and math were offered, participants still didn't attend because of the long break in the training process and job uncertainty.

Results for the maintenance and d/n/f departments follow:
In the maintenance department, 13 and 17 students' were administered both, pre and post **math** and **reading** tests, respectively. Testing was conducted at the beginning and at the end of class participation. Student's T tests for correlated samples were performed to examine the difference between the pre and post test scores.

In math, results indicate that there has been a significant

increase from one testing to the next (t = 3.65, df 12, $p < .01$). A comparison of the vocabulary scores also shows a significant increase. T-test results are highly significant (t=7.24, df=16, $p < .001$).

It is important to note that the total number of class participants (32) or finishers (23) was not included in these analyses due to missing values. In many cases, participants perceived testing as threatening and chose not to take either the pre or the post test. In the previous grant, it was found to be critical to keep up employee morale and trust levels to allow participants this choice.

Results obtained by students in the d/n/f departments were also significant. Statistically significant differences were found between pre and post test math scores (t= 4.45, df=9, $p < .01$). These scores may also be reflective of students' vocabulary gains, since vocabulary and math were combined in this class.

A communications post questionnaire was administered to 15 participants from the maintenance and d/n/f departments. Results indicate changes in participants' behavior after attending the classes. For example, respondents indicated that they learned how to express their feelings without blaming anyone else or that they try to see things from the other persons' point of view. Additionally, they indicated having learned that what they do

affects others behavior towards themselves, that conflict is the primary reason why people lose their jobs and that awareness of a person's personality can help them communicate more effectively etc.

Greige Plant

For the Greige Plant, changes were made in the way the instruction was delivered. There was a shift from teacher centered instruction to individualized computer assisted instruction. One hundred and thirteen workers participated in the education classes.

Pre and post test measures were administered to program participants, at the beginning and at the end of the math and reading classes. However, because the format of the pre and post tests varied (paper and pencil vs. computer based) no comparisons are possible. Analyses focused on the extent to which students moved forward in the program while completing their educational objectives. Based on observations and data provided by teachers it was noted that, a minimum level of computer literacy is necessary in order to use this particular software package for evaluation purposes.

Results obtained by students in the d/n/f departments were statistically significant. Differences were found between pre

and post test math scores (t= 4.45, df=9, $p < .01$). These scores may also be reflective of students' vocabulary gains, since vocabulary and math were combined in this class.

A communications post questionnaire was administered to 53 participants from the carding, spinning, weaving and cloth departments. Results also indicate positive changes in respondents' attitudes after attending the communication classes. Ninety five percent of the participants indicated that after attending the classes, they usually, or often, give other people a chance to talk. They also indicated having learned how to express their feelings without blaming anyone else and that they try to see things from the other person's point of view.

Additionally, consistent with responses made by employees from the Finishing Plant, at the Greige Plant participants indicated having learned that what they do, affects others behavior towards themselves. They further indicated that understanding one's personality traits, will help them be better team members on the job and that conflict is the primary reason why people lose their jobs.

Productivity Gains

One of the planned performance objectives was to assess instructional impact on productivity directly utilizing plant records for absenteeism, waste, production, etc. However, in

addition to the numerous variables that need to be included, many of which are beyond control, it was noted that seven or eight week grant classes were not enough to make large short-term impacts in productivity measures; the impacts develop slowly and are seen in more long-term measures such as job retention, job mobility/adjustment, and overall plant production. Thus, the focus was shifted to focusing on long term impact in two ways. First, the use of Utility Analysis methods to predict long term impact in dollars was explored. Secondly, a long term follow-up approach for the employees of the first grant was conducted.

Utility Analysis

In this project, even more so than in the previous one, it was found that interpreting direct productivity measures such as absenteeism, waste, repairs (errors), wages and quantity produced was the most difficult evaluation activity. For example, in the textile industry the particular job being run used to last for months, but today it may only last a matter of days. That means the set-up, teams, production rate, length of work week and pay may all change. Given this type of external variation and the limited resources, it was decided not to try to measure the impact of a seven week class. Additionally, as it has been mentioned earlier in this report, during this project there was a substantial downsizing, reducing the plants' worker pool from over 1,000 to under 700 and greatly impacting employees' willingness to invest extra time in classes. Yet, the main

question to be addressed remained being: How will this educational effort affect the bottom line?

Utility analysis (Boudreau, 1991) appears to be a valid way to estimate in dollars and cents the "bottom line" impact of educational efforts in the workplace. This analysis was used in two main departmental classes: mechanics and dye/nap/finishing.

The analysis is based on well-established industrial psychology research and practice in the area of criterion validation and job selection in predicting job performance (Brodgen, 1949; Brodgen & Taylor, 1950; Cronbach & Gleser, 1965). Personnel practices normally attempt to predict the long-term cost effectiveness of using certain criteria in hiring new employees. To accomplish this, researchers in industrial psychology have developed projection formulas that figure the actual dollar increase in productivity in particular conditions (Schmidt & Hunter, 1983; Schmidt, Outerbridge & Trattner, 1986).

Emphasis was switched to predicting long-term cost effectiveness of improving current employees' educational skills. The basic supposition is that an employee with new, different educational skills is in effect a new employee. Being able to state a projected dollar value for increased productivity is the desired outcome of this approach. The variables involved in calculating this estimate are quite obtainable in most any business/industry

setting. They include:

- o number of employees being educated
- o average tenure of those (or similar) employees
- o average pay of those (or similar) employees
- o employee gain scores for educational improvement (in Z-score units)
- o average cost of educational efforts for those employees
- o an estimated correlation between educational skills and job performance

This final variable is crucial and must be agreed upon by the business partner prior to proceeding. A vast amount of literature in the relationship of cognitive ability to job performance, done across many job settings and with high and low level employees, suggests that this relationship is somewhere between .10 and .50, with more advocates being toward the higher end of this range. A correlation of .20 has been conservatively used in the example that follows.

For the mechanics class there were 17 participants who took both, the pre and post vocabulary tests and 13 who took both math tests. The employees had only a seven week class and only five weeks were spent on vocabulary and math, so the pre-post differences should be minimal compared to what could be accomplished over a longer instructional period. The cost of $500 per employee is figured for each area, vocabulary and math, so it is being assumed that it cost $1,000 per employee for five

weeks of instruction -- an obviously high cost estimate.

- o Average tenure of this employees: 15 years
- o Average pay for these employees: $18,000/yr
- o Actual employee educational improvement
  (pre-post test differences in Z-score units)
  - Vocabulary 2.183
  - Math 0.980
- o Average cost of educational efforts
  - per employee $500
  - estimated correlation .20

  (education skills and job performance)
- o Net company performance increase (PER EMPLOYEE)
  - Vocabulary $311 /year and $ 4,665 over job life
  - Math $276/year and $ 2,067 over job life

In other words, even paying $1,000 per employee for the educational gains a cost benefit for each employee of $587 per year would still be generated. If 15 employees took the classes, even a after a $15,000 educational cost, there would be a yearly benefit of $8,805 and a ten year projected (no inflation adjustment) benefit of $88,050. Education pays.

For the dye/nap/finish department classes vocabulary instruction was incorporated into the math instruction. This provided more time on the higher need area of math. Thus, this class received math instruction for a five week period. For the 10 employees taking pre and post tests math improvements (in Z-score units) of 2.183 were obtained. In this case the estimated change in production would be $400 per employee per year, or $5,998 per employee job life, or a total job life cost benefit of $59,980 for the 10 employees who attended classes.

Considering that a high estimate of educational cost (e.g., $15,000 would hire a teacher full-time for six months) and a very conservative estimate of education-to-work correlation (.20) were used, these results are very encouraging. They indicate that even the projects' limited educational efforts had positive impact and were tremendously cost effective for the business.

Long-term Follow-up Study

An analysis of the Fabrication Plant employees who participated in the first National Workplace Demonstration Project department-specific classes was also conducted. This was done in two ways. First, the additional Learning Center instructional hours for all employees who participated in department-specific classes were examined. Second, 24 of these employees were randomly selected and on a one-on-one basis, a 20-item questionnaire was administered to them. The questionnaire dealt with the impact that the education classes had on their lives, at work, at home and in the community.

Study One: Long-term Additional Education

In the first analysis, focus was centered on all participants over the 10-month period which followed the end of department-specific classes (education classes). The number of Learning Center classroom instructional hours these employees voluntarily received over this 10-month period was calculated. This resulted

in an underestimate of their additional educational efforts for three reasons: 1) many of these employees took additional classes immediately after their education classes ended, in the period of time before the starting date used in this study. Thus, these hours of instruction were omitted. Second, there were reports from several employees that they continued their educational efforts elsewhere -- in fact, one has now graduated from a local technical college. Finally, for various reasons, some employees were unable to take additional classes because they were no longer employed during the period under study.

Results from this study of educational stimulation follow. Of the 186 Fabrication employees who attended any education classes, 74 (40%) voluntarily took additional instruction during the 10-month study period. These 74 accumulated 1,625 additional classroom hours, an average of 22 hours per employee. These results strongly suggest that the education classes provided an entry point and/or an incentive for further educational efforts.

Study Two: Self reported Long-term Life Impacts

For the second study, 24 randomly selected employees from the Fabrication Plant were interviewed. A 21-item questionnaire was administered to them. Results indicate that the work site educational experience had a significantly positive impact on interactions with co-workers on the job, interactions with supervisors on the job, pride and overall satisfaction in daily

work and time spent with and responsibility accepted in their own family.

In addition, the work site educational experience had a sizable positive impact on understanding equipment instructions and safety guidelines, responsibility accepted on job and in community and positive feelings about self and in dealing with family.

Participants' evaluations of their learning experience were almost unanimously positive as they agreed that the classes were a valuable experience that helped them form positive work attitudes. The only areas not affected were work areas not directly under the employees' control such as department decisions, promotion, keeping job, more money, and the social areas of worker interaction off the job and social/recreation activity. Participants comments' about the program are included in the Appendix section.

Perceptions about the Project

Questionnaires for employees, supervisors and teachers were developed with the purpose of gathering their perceptions and opinions about the program. These were administered either individually or in the case of the supervisors, by mail.

Employees

Twenty eight employees participating in the project were selected to respond to the questionnaire. Twenty worked at the Finishing Plant and eight at the Greige Plant.

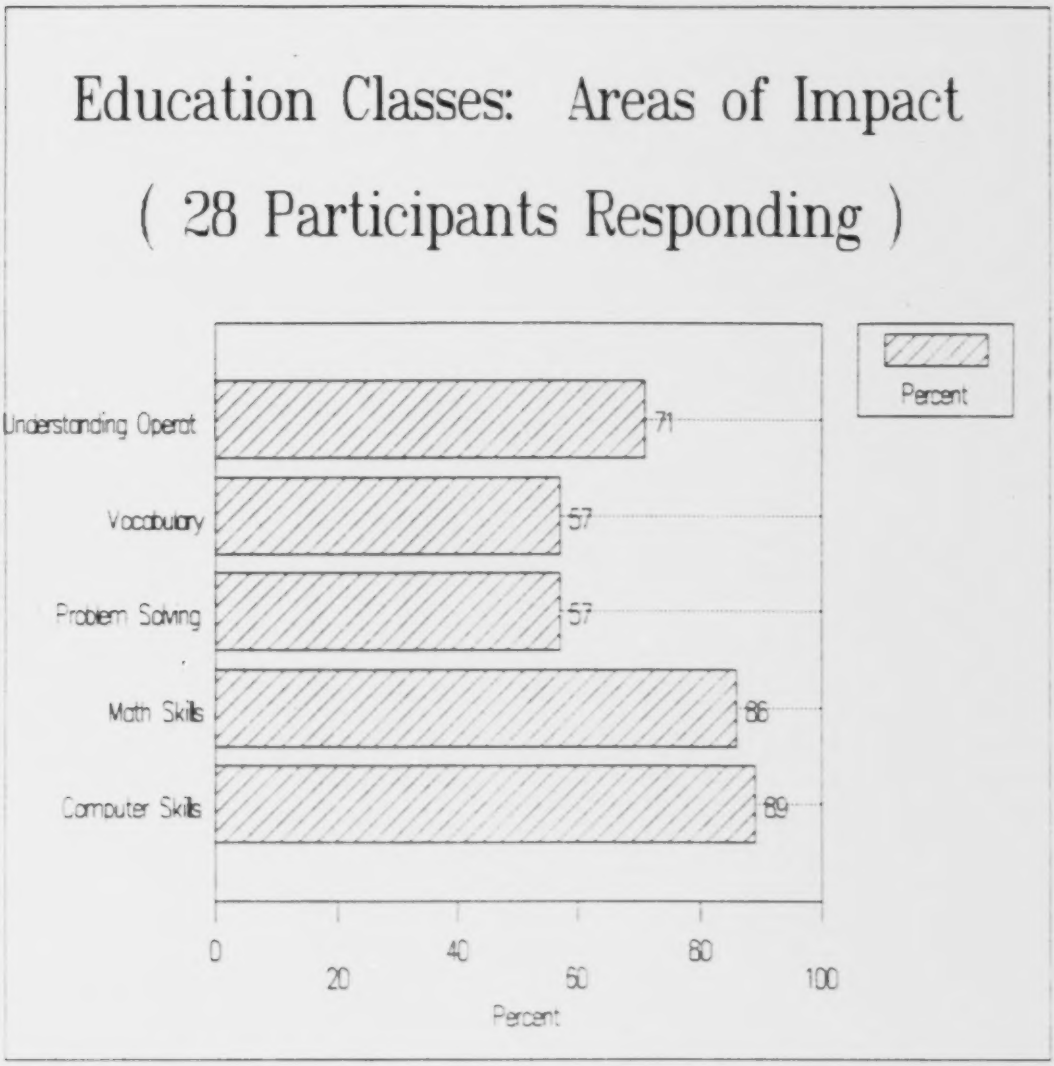
Employee responses indicate positive attitudinal changes. Eighty-six percent reported getting along better with co-workers, 82% having greater confidence in themselves and 61% having improved their attitudes on the job.

Seventy one percent of the employees responding to the survey alleged they had a better understanding of total plant operation, 54% felt they had a better relationship with management and 54% indicated being more efficient on their jobs.

Overall, participants reported a number of gains from their participation in the education classes. Seventy nine percent indicated that they could apply the information acquired to their jobs. Fifty percent also thought information could be applied to other jobs in the plant as well.

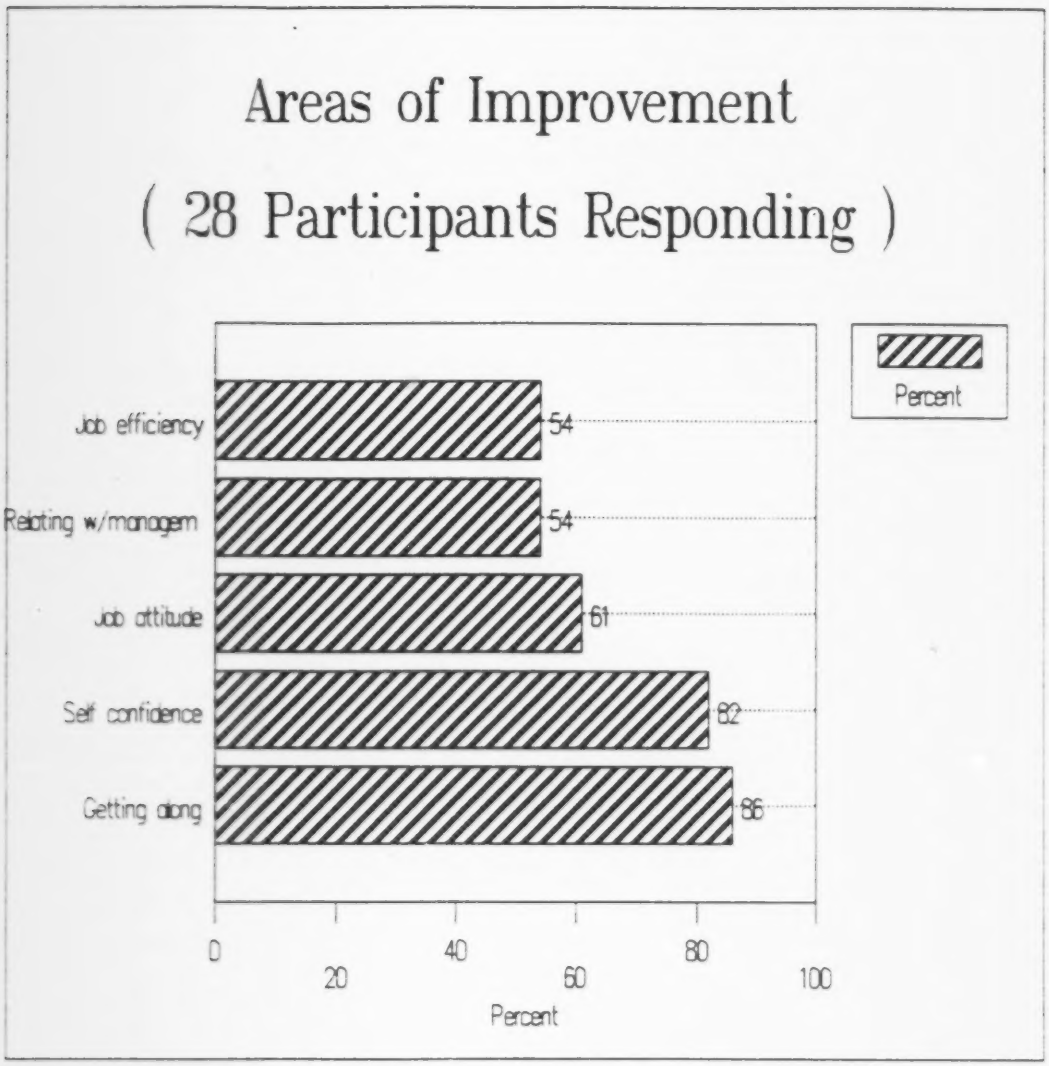
Eighty nine percent declared having improved their computer skills, while 86% indicated having increased their math skills. Fifty seven percent reported having a greater understanding of the vocabulary used on the job and being better able to solve problems.

Figure 5.



The education classes also encouraged participants to take additional classes, as reported by 82%. Computer skills and GED classes were among the most popular ones.

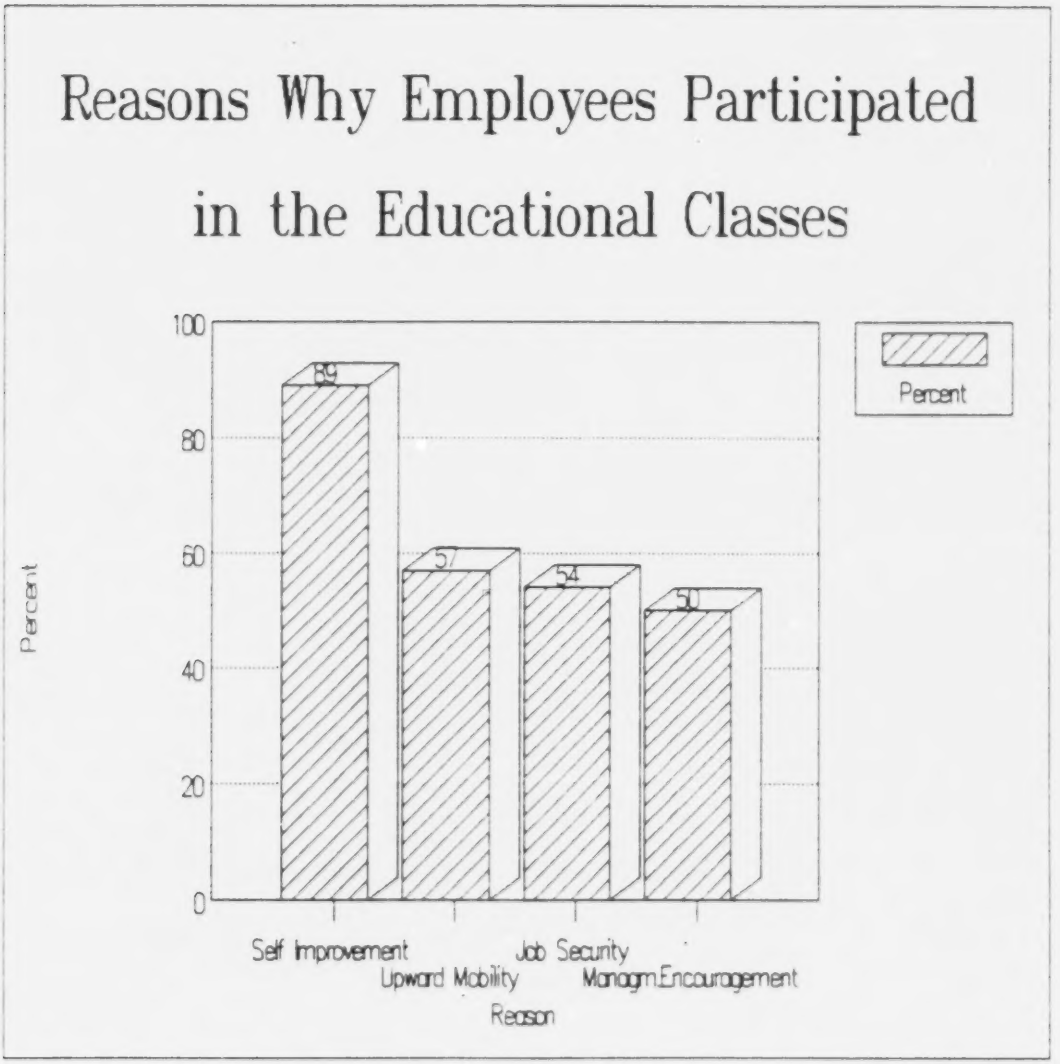
Figure 6.



In summary, participants perceived the education classes in a positive way. Among the reasons reported by workers for enrolling in the classes are self improvement (89%), getting ahead in the plant (57%), job security (54%) and being encouraged

by management (50%). It was interesting to note that the following reasons were not selected as important by respondents: recruitment meeting (36%), peer encouragement (25%), money (25%) and recommendation from other workers (11%).

Figure 7.



Participants also stressed on aspects they liked best about the program such as the relationship established with the teachers and the environment conducive to learning. The following examples of employees' comments illustrate ways in which the classes had helped them.

- ... not only for getting information about the jobs and the mill, but also how to get along with fellow workers.
- not only to learn about others, but about yourself and to advance your education.
- they help us to be the best at what we can be.
- to improve skills and understand what you read.
- employee and management being able to communicate.
- help me know how to count .... for our down time, and check out.
- I believe it is good learning and educating the mind and have a great respect for learning. My favorite is the computer.
- the classes were designed to help us on our job and at home. I liked the way the teachers came out on the job to see what we needed.

When asked of changes that the team could make to be more responsive to participants' needs, participants suggested additional classes, spending more time and working at a lower pace and a different schedule for the eight-hour employees. Examples of their comments follow:

"It would be nice to have more classes in different areas."

"They need to focus on the individual job that each one of us is running."

"More time on math, higher level math classes".

Supervisors

A total of eleven supervisors/managers responded to the questionnaire. Supervisors' responses and comments suggest that management was supportive of the project. One of the managers interviewed commented: "...there should be more of this type of training in the work place". Supervisors, consistent with employee responses, also indicated that self improvement, followed by upward mobility and job security were main reasons why employees attended the educational classes.

Seventy-three percent of the participants indicated that the education classes benefitted employees mostly by increasing their moral and self esteem. Sixty-four percent also indicated that plant employees also benefitted in terms of having a better relationship with management as well as improving the quality of their work. Better understanding of plant operation and getting along better with co-workers were also benefits selected by forty six percent of the respondents. Figure 5 shows these results.

Supervisors were asked to rate the areas in which the classes had the greatest impact on employees and as well as the degree of the impact. The areas of computer skills, reading skills, conflict resolution and communication skills were rated as the ones with the highest impact. Examples of comments made are:

"allows employees to learn at their own level and pace at a

convenient location"

"Everyone benefits from these classes"

"The communication skills were a very strong and positive part of the course. The math was also very helpful".

Teachers

Teacher perceptions about the project indicate that the educational classes impacted participants mostly in the areas of problem solving, communication, computer and math skills. Teachers also reported that the curriculum materials used were highly related to job content and mastery oriented.

Case Studies

Perhaps the greatest gains of the project can be demonstrated by the testimony of the employees that participated in the project. Employee statements were taken from structured interviews conducted by the evaluator of the project.

Jimmy

Jimmy is a 42 year old male in the maintenance department. He had dropped out of school and lacked confidence in both his reading and math skills. When Jimmy attended the recruitment session, the teachers comments "got him to thinking about bettering myself and improving my work on the job". Past experiences in school, that were primarily negative, contributed to Jimmy's reluctance to attend the classes, but he was encouraged by his supervisor to give it a try.

Jimmy's doubts were quickly overcome after attending class, for he found a climate of acceptance where "teachers care about you, taking time and giving encouragement". He described the classes in this way:

"Teachers came on the floor to find out what we needed to know about the job. They asked us questions and watched us work. Then the classes covered what we needed to know.

Vocabulary/Reading

When asked in what ways the reading/vocabulary portion of the classes had helped him, Jimmy responded, "I could always read the words okay, but the teachers helped me understand what I was reading. The vocabulary lessons on the computer taught me the words I needed to know in my job. I had never worked on the computer before and I was excited to find that I could really do it. It made me want to take more classes on using the computer."

Math

In response to questioning on how math classes had assisted him, Jimmy said, "The teacher gave me a test to find out how much I knew and then started teaching me from there. I learned that math wasn't so hard after all and that I can really do it well. We were all taught the metric system and I now use it all the time on the job."

Communication

Jimmy said that he liked the communication classes the best. "It was exciting to learn more about myself. I also learned how to express myself better (I was never very good at this). This part of the course gave me confidence and raised my expectations of myself. One of the things I liked the best about this class is that it was practical. Most of what I learned, I could use on the floor. By the end of the course, I knew that I would continue to take more classes and set new goals for myself."

After Jimmy had taken the class, he was asked by the management of WestPoint Stevens Plant to represent the employers at a regional meeting in Anderson, South Carolina. There, he talked to employees of other plants and found that the other plants did not offer similar training opportunities. He returned to the plant with even greater desire to take advantage of the training offered at the WestPoint Stevens Plant. Jimmy takes every chance he has to encourage his co-workers to visit the classroom and talk to the teachers about the available training. Jimmy is continuing classes in computer and has obtained his GED certification. He tells everyone he can how much he has benefited from the classes. He says that "the classes have motivated him to expect more of himself. It's like beginning a new life".

Larry

Larry, who now works in the bleach department, told his story of starting over. He had worked at the plant for 15 years, his entire working life. When his job was eliminated due to automation, Larry found himself with the threat of unemployment and no transferable skills to other jobs within the plant. Management suggested that he enhance his skills through the classroom, with the hope of becoming qualified in other job related areas.

Larry joined the workplace literacy classes and gained confidence

in his ability to learn new skills, with constant encouragement from the teaching staff. Upon completion of the course, he continued to work on his GED. Most of the available job openings required computer knowledge, so Larry also learned to use the computer.

In October of 1993, Larry spoke to the participants of the training workshop and told them that the classes and the teachers had "saved his life". Today, Larry is operating one of the most expensive pieces of machinery in the plant and doing a commendable job, according to his supervisor.

Melvin

Melvin attended the recruiting sessions presented for his department(dye) with some reluctance, because here-to-fore he had been afraid to let management know how poor his reading skills were for fear his job would be threatened. The teachers quickly assessed his low reading ability. They determined, by use of an IRI, that Melvin was reading at a low second grade level. While he continued with the project classes in an individualized mode, teachers discussed with him a more intensive approach to addressing his reading problem. It was agreed that Melvin would attend classes whenever possible work with a tutor, learn computer skills and work individually with one of the teachers.

Throughout the 1993 year, Melvin continued his studies with the

project team and progressed at an impressive rate. By October, he was reading at a fifth grade level and was ready to begin working on skills needed to pass the GED exam. Teachers and supervisor commented that not only did his skills improve but that there was evidence that his confidence and self esteem had greatly improved. Melvin said that he never thought he "could do it", and that he felt like a new person. His gratitude to the teachers was unlimited. Teachers expect that he will be ready to attempt the GED in the spring. Melvin has already started to plan his next goals!

Task Analysis and Curriculum Guide Notebook

These have been completed and will be included in the project director's report.

Master Job Mobility Chart

The Master Job Mobility Chart has also been completed and will be addressed by the project director.

RECOMMENDATIONS/OBSERVATIONS

The following recommendations/observations were made by the advisory committee, the evaluator and the staff throughout the duration of the project. In many cases, the observations are generic to literacy in the workplace and could be applicable to other programs.

- The support by plant management is essential to launching and maintaining a workplace literacy program.

- It is essential that sufficient time be allotted to classroom training in one area, if quantitative and standardized literacy gains are a desired outcome of the project.

- Productivity rates can be quantitatively correlated with training in the workplace if there are a sufficient number of participants attending the classes and enough time devoted to the skill in question.

- The training staff must set realistic objectives that can be transferred to the workplace.

- Job related training tends to motivate the participants.

- The training team needs to be sensitive to the fears and needs of the students. Because of a host of negative experiences associated with "school", a caring and non-judgmental climate is important to the employee/student (see Perin, D. & Greenberg, D., 1993; Quigley, B.A., 1993).

- Instructional approaches should be innovative, flexible, relevant and delivered in a non-threatening manner.

- Because of diverse ability levels among any group of participants, it is desirable to structure a program that can be individualized.

- The summer months tend to discourage high numbers of participation because of vacations.

- Project classes should be coordinated with the regular plant training to attain maximum results for the long-term.

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APPENDIX A

COMMUNICATIONS POST TEST

COMMUNICATIONS: What have I learned?

Use the scale below by circling one of the numbers (1-5) to rate your behavior after attending this class.

	USUALLY	OFTEN	SOMETIMES	NOT USUALLY	HARDLY EVER
1. I give other people a chance to talk.	1	2	3	4	5
2. When I listen, I concentrate on the speaker rather than the message.	1	2	3	4	5
3. When I talk about my activities and experiences, I constantly use the word I.	1	2	3	4	5
4. I am learning how to express my feelings without blaming anyone else.	1	2	3	4	5
5. I frequently challenge co-workers ideas or opinions and feel they don't know as much about the situation as I do.	1	2	3	4	5
6. I tend to listen more than talk.	1	2	3	4	5
7. I try to see things from the other persons' point of view.	1	2	3	4	5

Please check whether you think the following statements are true or false regarding what you have learned in this class.

	TRUE	FALSE
8. What I do affects how others behave toward me.	___	___
9 . Understanding one's personality traits will help me be a better team member on the job.	___	___
10. If I improve my listening skills, I will also improve my job performance.	___	___
11. Conflict is the primary reason why people lose their jobs.	___	___
12. Listening and hearing are the same thing.	___	___
13. Awareness of a person's personality can help me communicate more effectively.	___	___
14. Conflict at work often is caused by one's personality.	___	___

APPENDIX B

SUPERVISORS QUESTIONNAIRE

Literacy in the Workplace
West Pepperell Textile Plant
Clemson, South Carolina

Supervisors Questionnaire

We would appreciate your feedback regarding the education classes and their effectiveness.

1. Where do you think the literacy classes benefited your employees. Check all that apply.

___ Get along better with co-workers
___ Better understanding of total plant operation
___ Improvement in quality of work
___ Less errors in work
___ More efficient on job
___ Increased employee moral
___ Improved self esteem
___ Better relationship with management

Other benefits/comments: _____

_____

2. Which of the following are reasons you think your employees attended the education classes?

___ Self improvement
___ Job security
___ Upward mobility in workplace
___ Financial incentive
___ Recruitment meeting
___ Encouragement from management
___ Peer encouragement

3. Based on your perceptions of the education classes, please indicate where you believe the classes have had an impact on your employees and how strong this impact has been.

		Very high impact				Little or no impact	No Impact
a.	Computer Skills	5	4	3	2	1	0
b.	Decision Making	5	4	3	2	1	0
c.	Problem Solving	5	4	3	2	1	0
d.	Reading Skills	5	4	3	2	1	0
e.	Communication Skills	5	4	3	2	1	0
f.	Math Skills	5	4	3	2	1	0
g.	Conflict Resolution	5	4	3	2	1	0
h.	Other	5	4	3	2	1	0

Comments: _____

_____

APPENDIX C

EMPLOYEE QUESTIONNAIRE

Literacy in the Workplace
West Point-Stevens, Inc. Textile Plant
Clemson, South Carolina

Employee Questionnaire

1. How did your experience in the education classroom benefit you? Please check those items that apply to you.

__	get along better with co workers	__	better understanding of total plant operation
__	less errors in work	__	more efficient on my job
__	greater job satisfaction	__	greater confidence in myself
__	better relationship with management	__	improved attitude on job
__	greater understanding of the vocabulary in my job or plan	__	gained computer skills
		__	increased math skills
__	better able to solve problems	__	no benefit at all

__ Other benefits? _____

2. What were the reasons you chose to attend the education classes? Please check all reasons that apply to you.

____ To get ahead in plant
____ Money
____ Recruitment meeting
____ Recommendation from other workers
____ Encouraged by management
____ Job security
____ Peer encouragement
____ Self improvement
____ Other

3. Did this experience encourage you to take additional classes?

Yes ____ If Yes, in what area(s):_____

No ____

4. Can the information you acquired be applied to:

a) Your job in the plant? Yes ____ No _____
b) Other jobs in the plant? Yes ____ No _____

5. What changes could the team make to be more responsive to participants' needs?

_____

_____

6. Have you heard from supervisors/employees about any results or impact on personal changes? Please comment.

_____

_____

7. Do you have a good understanding of what the classes are about? Please explain.

_____

_____

APPENDIX D

TEACHER QUESTIONNAIRE

Literacy in the Workplace
West Point-Stevens, Inc. Textile Plant
Clemson, South Carolina

TEACHER QUESTIONNAIRE

1. Based on your perceptions of the education classes, please indicate how you believe their classes have had an impact on your employees and how strong this impact has been.

		Very High impact				Little impact	No Knowledge
a.	Overall literacy skills	5	4	3	2	1	0
b.	Overall job skills	5	4	3	2	1	0
c.	Efficiency on the job	5	4	3	2	1	0
d.	Upward mobility	5	4	3	2	1	0
e.	Problem solving skills	5	4	3	2	1	0
f.	Communication skills	5	4	3	2	1	0
g.	Computer skills	5	4	3	2	1	0
h.	Math skills	5	4	3	2	1	0
i.	Reading/Vocabulary skills	5	4	3	2	1	0

2. Please indicate the extent to which curriculum materials used in the education classes are:

		Very High impact				Little impact	No Knowledge
a.	Job content related	5	4	3	2	1	0
b.	Individualized	5	4	3	2	1	0
c.	Mastery oriented	5	4	3	2	1	0
d.	Computer assisted	5	4	3	2	1	0

3. Have you held individual counseling sessions with participants?

_____ Yes _____ No If yes, please describe.

_____

_____

4. Please describe how the workers' job literacy deficiencies were identified.

_____

_____

5. Please describe the process of developing and selecting curriculum materials.

_____

_____

_____

_____

_____

6. Did the materials vary for each department? Please explain.

_____

_____

_____

APPENDIX E

COURSE EVALUATION FORMS

COURSE EVALUATION

Name:_____ Date:_____ Class:_____

1) What can you do now that you couldn't do before taking this course?

2) How many classes have you attended so far?
_____ classes.

3) Has this course helped you meet or work toward any of your personal goals?
_____ yes _____no

(If you checked yes, please answer the next part of the question)

In what way?

4) Circle one number in each row across to show how you would rate each item.

How would you rate this program?

Very interesting to me	5	4	3	2	1	Boring to me
Very useful to me on the job	5	4	3	2	1	Totally useless to me on the job
Much too difficult for me	5	4	3	2	1	Much too easy for me
Very useful to me outside work	5	4	3	2	1	Totally useless to me outside work
Exactly what I expected	5	4	3	2	1	No at all what I expected

How would you rate the materials?

Hard to learn and confusing for me	5	4	3	2	1	Easy to learn and simple for me

5) Would you recommend this courses to a co-worker or friend?
_____yes _____no

Why or why not?

6) If you could change anything about this program, what would it be?

Thank you for taking time to complete this form. Your answers will be strictly confidential.

APPENDIX F

SELF REPORTED LONG-TERM LIFE IMPACTS
(Participants' Comments)

Question #21 "How has taking Learning Center classes changed your life?" answers:

taught me how to deal with people better. Brought me up on my math. I enjoyed working with the computer. I enjoyed the teachers. They were real nice.

I'm a little more at ease with the machine. I have more self-confidence in working with it. I can understand supervisors better. I can understand the situations they face.

I got to work on the computers. I'm working on my GED. I'm also taking a mandatory mechanics class.

More aware of the company's feelings for me. I didn't think the company cared, but through this (LC) I think it does. I think we need more time. I think everyone should be involved in the Learning Center.

Made me feel better about myself -- because I had not finished school. I got my GED.

Remained the same. You would have learned what was taught in LC on the job anyway. It didn't really pertain specifically to my job. Didn't expect it to be cross training.

I feel better about myself. I was hoping to get a better job, but that did not happen. That's why I stopped taking classes. Very disappointed. It showed me I could learn. I was real proud of myself. I was real pleased with all the teachers.

I was afraid of computers. I feel more comfortable with them. I feel a lot more confident about myself. When people speak socially I can talk and understand when they talk about computers. It helped my confidence in myself when we got a computer on the job.

I feel more positive about things. It was a great day when I got my GED. I took 3 computer courses. Anna was a terrific teacher. Mechanics are

paid for their time; I think more people would take classes if they were paid. Department training classes had many interruptions by another instructor and one of the students.

I learned computer skills I didn't have beforehand. We had to take classes on our own time. If it were on our work time it would be more convenient. It did not help me at all on my job, i.e., promotion.

I feel better about myself. I am more qualified for more things. I encouraged a lot of people to do it and they did. It's something you have to make time for, but it's very worthwhile. I wish we could get more people to do it.

I learned more. I learned stuff that I didn't in high school -- English, math. I feel more positive. I feel good about myself.

I learned how to do math and spelling. I did learn to use the computer.

I have a better attitude about everything -- especially on the job.

Makes me want to do more -- further my education. Learn more about the computer.

I feel better about myself having taken them. I was interested in working with the computers. It really didn't pertain to my job.

Would like to learn more. I feel like I have a better attitude -- on the job. I would like to learn the computers.

Made me better aware of my job. Made me aware of the machine and how safety conscious you should be in your work area. They have real good teachers. They take the time to help you.

I learned how to work on the computers -- Apple, Mac. I learned WordPerfect. If I used this on my job, it might be different if I did. If I used it on my job it might have affected things more.

Not a whole lot. It's about how it was. I took classes to meet people.

Has not changed my life.

I understand the computers more. My math has improved a lot. I can type faster, I took WordPerfect.

Yes, I learned more about computers.

It hasn't helped me further myself in my job. It is more for my benefit. Don't use a computer on the job. I would prefer having one larger class and an instructor instead of several classes in one area.

APPENDIX G

TIME LINE AND DEGREE OF IMPLEMENTATION

Literacy in the Workplace

Finishing and Greige

TIME LINE AND DEGREE OF IMPLEMENTATION							
Monitoring Checklist							
	Jun/Jul 1992	Sep/Nov 1992	Dec/Feb 1992	Mar/May 1993	Jun/Jul 1993	Aug/Sep 1993	Oct 1993
1. Set of Literacy demands identified (task analysis)	X	X	X	X			
2. Literacy demands matched for each job and curricula modified	X	X	X	X	X		
3. Job literacy deficiencies identified		X	X	X	X	X	
4. Implementation of curriculum		X	X	X	X	X	X
5. Task analysis and curriculum guide notebook						X	X
6. Master Job mobility chart						X	X
7. Evaluation		X	X	X	X	X	X

APPENDIX H

ADVISORY COMMITTEE MEMBERS

ADVISORY COMMITTEE MEMBERS

RAY EBERHARD	STATE ADULT EDUCATION DIRECTOR, SACRAMENTO, CA.
JOEL GREENSTEIN	ASSOCIATE PROFESSOR OF INDUSTRIAL ENGINEER, CLEMSON UNIVERSITY.
ED HILL	DIRECTOR OF CLEMSON APPAREL RESEARCH.
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